HDVI-20d

User's Manual

Version 1.50
(12/2005)

Doremi Labs, Inc.
Burbank, California

1 Tables of Contents

1 Tables of Contents 2
2 Description 7
2.1 HDVI-20d vs. HDVI-20s 7
3 HDVI-20d Operation 8
3.1 Resolution 8
3.2 Frequency 8
4 Supported Output Resolutions 9
5 Supported Input Resolutions 9
5.1 DVI-A Special Instructions 9
6 OSD and Remote Control functions 10
6.1 Restore I/O settings 11
6.2 Input Source Selection 11
6.3 Picture Settings 11
6.4 OSD Settings 11
6.5 SDI Settings 11
6.6 Output Settings 12
6.7 Miscellaneous Menu 12
7 Troubleshooting 12
8 Firmware Upgrade 13
8.1 Wiring of the HDVI-20d RS422-PC cable 14
9 Recommended LCD Monitors 15
9.1 Note about the Viewsonic VP2290b 15
9.2 Note about the Apple Cinema Displays 15
10 Specifications 16

WARRANTY

Doremi's warranty obligations are limited to the terms set forth below:

Doremi Labs, Inc. ("Doremi") warrants this hardware product against defects in materials and workmanship for a period of ONE (1) YEAR from the date of original retail purchase.

If you discover a defect, Doremi will, at its option, repair, replace, or refund the purchase price of this product at no charge to you, provided you return it during the warranty period, with transportation charges prepaid, to your nearest Doremi Labs repair facility. To each product returned for warranty service, please attach your name, address, telephone number, and a copy of the bill of sale bearing the appropriate Doremi serial numbers as proof of date of the original retail purchase. You will also need to contact Doremi Labs technical support to receive a return authorization number (RMA).

This warranty applies only to hardware products manufactured by or for Doremi that can be identified by the "Doremi Labs" trademark, trade name, or logo affixed on them. Doremi software is warranted pursuant to a separate written statement packed with the software. Doremi does not warrant any products that are not Doremi products. This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication; if the product has been modified without the written permission of Doremi; or if any Doremi serial number has been removed or defaced.

THE WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHERS, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. DOREMI SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. No Doremi distributor, agent, or employee is authorized to make any modification, extension, or addition to this warranty.

DOREMI IS NOT RESPONSIBLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY, OR UNDER ANY OTHER LEGAL THEORY, INCLUDING BUT NOT LIMITED TO LOST PROFITS, DOWNTIME, GOODWILL, DAMAGE TO OR REPLACEMENT OF EQUIPMENT AND PROPERTY, AND ANY COSTS OF RECOVERING, REPROGRAMMING, OR REPRODUCING ANY PROGRAM OR DATA STORED IN OR USED WITH DOREMI PRODUCTS.

Software License Agreement

THIS SOFTWARE LICENSE AGREEMENT is provided by Doremi Labs, Inc. ("Licensor").
PLEASE READ ITS TERMS CAREFULLY, AS YOUR USE OF THE SOFTWARE WILL CONSTITUTE YOUR ACCEPTANCE OF THE TERMS OF THIS AGREEMENT.

1. License. Licensor grants to the customer a non-transferable and non-exclusive license to use the software and associated documentation being provided with the Doremi Labs equipment being acquired by the Customer (respectively, the "Software" and the "Documentation"). Title in, ownership of, and all right associated with the Software shall remain vested in the Licensor. THE CUSTOMER SHALL HAVE NO RIGHT TO MODIFY, DE-COMPILE, REVERSE ENGINEER OR TRANSLATE THE SOFTWARE OR THE DOCUMENTATION OR DISTRIBUTE COPIES THEREOF TO ANY OTHER PERSON OR ENTITY. Licensor reserves all rights not expressly granted to you.

2. Confidentiality of the Software. The Customer acknowledges and agrees that the Software and the Documentation constitute valuable proprietary products and trade secrets of the Licensor embodying substantial creative efforts and confidential information, ideas and expressions. The Customer agrees to maintain in all respects the confidentiality of the Software including, without limitation, agreeing not to disclose or otherwise make available to any other person or entity, in any manner, the Software in any form whatsoever, except that such disclosure or availability shall be permitted to an employee of the Customer whose duties and responsibilities require access to the Software in the course of his or her employment or to agents or independent contractors of the Customer performing maintenance or support services requiring access to the Software. The Customer further agrees not to alter or remove any copyright or other proprietary rights notice or identification which indicates the Licensor's ownership from any part of the Software.

3. License Non-Transferable. Neither the license granted by this Agreement nor any copies of the software, the documentation, or any other materials delivered by the Licensor to the Customer pursuant to this Agreement may, in whole or in part, be assigned, sublicensed, loaned out, distributed, or otherwise transferred by the Customer to any other person or entity without the prior written consent of the Licensor. Any attempt to so assign, sublicense, loan, distribute or otherwise transfer such materials shall be deemed null and void. If the Customer desires to transfer the license in connection with a sale of the Doremi Labs equipment being purchased by another Customer, the Licensor hereby consents to the assignment of the license provided (a) such sale otherwise complies with the terms of this agreement and applicable law and (b) the transferee reads and agrees to accept the terms and conditions of the agreement.

4. Export by Law Assurances. The Customer agrees and certifies that neither the Software and documentation nor any direct products thereof is being or will be downloaded, shipped, transferred, exported, or re-exported, directly or indirectly, into any country to which export is prohibited by the laws and regulations of the United States.

5. Government End Users. If acquiring the Software on behalf of any unit or agent of the United States government, the Customer agrees that: (a) the Software is "Commercial Computer Software" as the term is defined in paragraph 27.401 of the DoD Supplement to the Federal Acquisition Regulations (the "Supplement") or is within the equivalent classification of any other federal agencies' regulations; (b) the Software was developed at private expense, and no part of it was developed with government funds: (c) the government's use of the Software is subject to "Restricted Rights" as that term is defined in clause 52.227-7013 (b) (3) (ii) of the supplement or in the equivalent clause of any other federal agencies' regulations; (d) the Software is a "trade secret' of the licensor for all purposes of the Freedom of Information Act; and (e) each copy of the Software will contain the Following Restricted Rights Legend:

"Restricted Rights Legend"

Use, duplication, or disclosure is subject to restriction as set forth in the subdivision (b) (3) (ii) of the Rights in the Technical Data and Computer Software clause at FAR 52.227-7013. Manufacturer: Doremi Labs, Inc., 306 E. Alameda Ave., Burbank, CA 91502.

The Customer agrees to indemnify Licensor for any liability, loss, costs and expense (including court cost and reasonable attorney's fees) arising out of any breach of the provisions of this Agreement relating to use by the government.

6. Terms. The license is effective until terminated. Customers may terminate it at any time by destroying the Software together with all copies. The license will also terminate upon conditions set forth elsewhere in this Agreement. The Customer agrees upon such termination to destroy all copies of the Software.

7. Disclaimer of Warranty.

THE SOFTWARE IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO ITS MERCHANDABILITY OR ITS FITNESS FOR ANY PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE SOFTWARE IS WITH THE CUSTOMER. SHOULD THE SOFTWARE PROVE DEFECTIVE, THE CUSTOMER (AND NOT LICENSOR OR A LICENSOR AUTHORIZED DISTRIBUTOR) ASSUMES THE ENTIRE COST OF ALL NECESSARY SERVICING, REPAIRING, OR CORRECTION.

LICENSOR DOES NOT WARRANT THAT THE FUNCTIONS CONTAINED IN THE SOFTWARE WILL MEET THE

CUSTOMER'S REQUIREMENT OR THAT THE OPERATION OF THE SOFTWARE WILL BE UNINTERRUPTED OR ERROR FREE OR THAT DEFECTS IN THE SOFTWARE WILL BE CORRECTED. IF ANY MODEL OR SAMPLE WAS SHOWN TO THE CUSTOMER, SUCH A MODEL OR SAMPLE WAS USED MERELY TO ILLUSTRATE THE GENERAL TYPE AND QUALITY OF THE SOFTWARE AND NOT TO REPRESENT THAT THE SOFTWARE WOULD NECESSARILY CONFORM TO SUCH A MODEL OR SAMPLE.

Some states do not allow the exclusion of implied warranties, so the above exclusion may not apply to the Customer.

8. Limitation of Remedies. The Licensor shall not, under any circumstances, be liable to the Customers for any indirect, consequential or incidental damages arising out of the use, or results of use of, the software and documentation or otherwise relating to the functioning thereof or arising out of any breach of this agreement by the Licensor, even if the licensor has been advised of the possibility of such damages. Licensor's liability to the Customer for actual damages for any cause whatsoever, and regardless of the form of the action, will be limited to the greater of $300 or the money paid for the Software that caused the damages or that is the subject matter of, or is directly related to, the cause of action. Some states do not allow the limitation or exclusion of liability for incidental or consequential damages so the above limitation or exclusion may not apply to customer.

9. General.

(a) The terms of this Agreement are intended as a final expression of the parties' agreement with respect to such terms as are included in this Agreement and may not be contradicted by evidence of any prior or contemporaneous agreement. This Agreement constitutes the complete and exclusive statement of its terms and no extrinsic evidence whatsoever may be introduced in any judicial proceeding, if any, involving this Agreement.

(b) This Agreement shall be construed and enforced in accordance with the laws of the State of California applicable to contracts made and to be performed entirely in the State of California.

(c) If any portion of any provision of this Agreement is ruled invalid or unenforceable under any applicable law, that provision will be enforced to the maximum extent permissible, and the remainder of this Agreement shall continue in full force and effect.

CE NOTICE

Marking by the symbol CE indicates compliance of the device to the EMC (Electromagnetic Compatibility) directive and to the Low Voltage directive of the European Community. Such marking is indicative that this device meets or exceeds the following technical standard:

- EN 55022 "Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment."

A "Declaration of Conformity" in accordance with the above standard has been made and is on file at Doremi Labs, Europe, Valbonne, France.

2 Description

Doremi Labs' HDVI-20d is a universal DVI-D converter / switcher. It converts SDI, HD-SDI, DVI-D and DVI-A (analog RGB) to DVI-D (digital RGB). It automatically detects the input scan rate and supports a wide variety of video formats including PAL, NTSC, 720p, 1080p, 1080i and 2K (2048x1080). It also automatically detects the resolution of the connected DVI-D monitor using EDID messages and supports a wide variety of progressive scan displays including computer LCD monitors, HDTV Televisions with 720p, 1080i and 1080p support, video projectors and displays (Plasma, DLP, D-ILA etc.).

The HDVI-20d is an easy to use plug-and-play box that allows the use of much lower priced DVI monitoring for SD and HD pictures. Set-up and operation are easy, as they should be. But to ensure that the images look good always, Doremi has focused attention on the technical detail of the many facets of the conversion process.

- Accurate spatial interpolation for clear sharp rendition of static images
- Advanced de-interlace processing for clear, accurate output of moving images
- Image output is automatically matched to the size of the monitor display to give optimum results and avoid further processing
- Temporal processing for smoother frame rate conversion
- Small size, low power consumption

2.1 HDVI-20d vs. HDVI-20s

There is only one difference between the HDVI-20d and HDVI-20s. The HDVI-20s has a single SD/HD SDI input with a loop through output, while the HDVI-20d has a dual link HD-SDI input, so no loop through output on the HDVI-20d.

3 HDVI-20d Operation

On power up, the HDVI-20d will automatically detect the input format of the selected input and will send a message to the monitor connected via DVI requesting its EDID parameters. The EDID parameters of the connected monitor will be used by the HDVI-20d to determine its output resolution.

The HDVI-20d's DVI-D output has 2 major controls: Resolution and Frequency.
Resolution:
Can be set to Auto (default) or forced to 1024x768, 1280x720, 1280x768, 1280x1024, 1366x768, 1400x1050, 1920x1080, 1920x1200 or 1080i
Frequency:
Can be set to 48Hz, 50Hz, 60Hz (default) or forced to Frame Sync.

3.1 Resolution

The output resolution can be set to Auto, 1024x768, 1280x720, 1280x768, 1280x1024, 1366x768, 1400x1050, 1920x1080, 1920x1200 or 1080i, using the On Screen Display (OSD). In Auto mode, the output resolution will be set to match the monitor up to 1920x1200.

- If the EDID response of the monitor is not recognized or is higher than 1920x1200, the HDVI-20d will default to 1280x1024. In the case where this same monitor does not support 1280x1024, the output resolution can bet forced using the infrared remote control and without the OSD interface by using the TV/Video + Number combination according to the following table:
    - TV/Video + 0 => Auto Mode
    - TV/Video + 1 => 1024x768
    - TV/Video + 2 => 1280x720
    - TV/Video + 3 => 1280x768
    - TV/Video + 4 => 1280x1024
    - TV/Video + 5 => 1366x768
    - TV/Video + 6 => 1400x1050
    - TV/Video + 7 => 1920x1080
    - TV/Video + 8 => 1920x1200
    - TV/Video + 9 => 1080i
- In case of a TV set that reports 1080i, the HDVI-20d will output a compliant 1080i signal and the TV will display it properly.

3.2 Frequency

The default frequency is 60Hz because it works with all displays. If your display supports lower frequencies and if your input source is running at 24/48, 25/50 Frames/Fields per second, you can avoid motion artifacts by forcing the output frequency to Frame Sync.

4 Supported Output Resolutions

The HDVI-20d supports all progressive scan resolutions up to 1920x1200; it also outputs 1080i for TV sets.

5 Supported Input Resolutions

Input	Resolution
HD-SDI	All HD formats, NTSC, PAL, 2K-psf, 2K-p and 720p-50, 422 (Link-A) or 444 (Links A and B)
SD-SDI	NTSC, PAL (Link-A)
DVI-D	All DVI-D interlaced and progressive scan formats up to 1920x1200
DVI-A	All DVI-A RGB analog formats up to 1920x1200 YPbPr not supported on this input

5.1 DVI-A Special Instructions

Analog input sources can be noisy and jittery. We strongly recommend using the digital inputs whenever possible. If you have to use the analog input, make sure your timing is compliant with the CEA-861-B standard, especially for 1920x1080p @ 60 Hz. These are the Guidlines for DVI-A inputs :

1. The timing must comply with the standards : VESA or CEA
2. The Pixel Clock should be less than 165MHz
3. For 1920x1080, the timing must comply with CEA-861B that yields a pixel clock of 148.5 MHz.
4. For 1920x1200, the timing must comply with VESA or CEA, the total number of pixels must be less than 2200 and the pixel clock must be lower than 165MHz.

The pixel clock P is equal to:
P = total_horizontal_size x total_vertical_size x refresh.

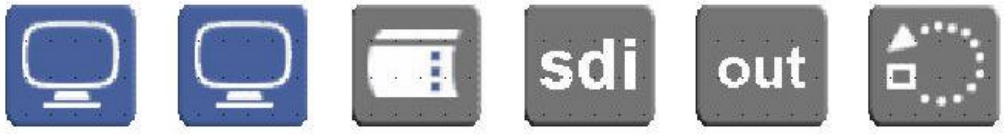
For a 1024*768 at 85 Hz:
total_horizontal_size = 1376 (1024 pixels + horizontal blanking)
total_vertical_size = 808 (768 + horizontal blanking)
refresh = 85

P = 1376 * 808 * 85
P = 94503680 Hz
P = 95.5 MHz

6 OSD and Remote Control functions

By default, the HDVI-20d infrared (IR) controls are unlocked. To lock, press “MUTING” for 4 seconds. The same process can be used to unlock the IR controls. The lock state of the HDVI-20d is saved even if the unit is turned off. Please make sure the included IR remote is in TV mode and not in Cable mode by pressing the TV button.

To access the OSD menu, press “RECALL”. The OSD will display six icons:



From left to right, these Icons represent:
Input Source Selection | Picture Settings | OSD Settings | Input Settings | DVI Output Settings | Miscellaneous

To navigate through the menus, use the 2,8,4,6 button on your remote as Up, Down, Left, Right. The table below explains all remote functions in both cases: On-screen display (OSD) ON or OFF.

HDVI-20d Remote Control	**Key**	**Function**
OSD OFF		
Input Select	CH +	Switch between HD-SDI, SDI, DVI-D, DVI-A
Toggle IR lock	Press and hold MUTING for 4 seconds	Lock/Unlock IR.
Restore I/O settings	**POWER**: See paragraph 6.1	Restore I/O settings
Force Flash Mode	Press and hold TV/VIDEO for 4 seconds	Displays a red screen to indicate that the unit is in flash mode and ready to be upgraded
Menu Access	RECALL	Access the menu system
Force Output Mode	**TV/Video + 0-9** **TV/Video + 0** **TV/Video + 1** **TV/Video + 2** **TV/Video + 3** **TV/Video + 4** **TV/Video + 5** **TV/Video + 6** **TV/Video + 7** **TV/Video + 8** **TV/Video + 9**	Force the DVI-D output to: Auto Mode 1024x768 1280x720 1280x768 1280x1024 1366x768 1400x1050 1920x1080 1920x1200 1080i
OSD ON		

Up	2	Navigate up
Down	8	Navigate down
Left	4	Navigate left
Right	6	Navigate Right
Exit	0	Exit submenu and menu
Select	ENTER or 5	Activate the selection

6.1 Restore I/O settings

This mode is very important should you lose track of the I/O settings of the HDVI-20d. When the I/O settings are restored, the HDVI-20 output will be set to 1280x720-59.94. The input will be set to Pattern and the unit will output color bars.

To Restore I/O settings, turn the unit OFF, Hold the POWER button down and turn the unit back ON while keeping the POWER button down for at least 20 seconds then release the POWER button and recycle power to the unit.

6.2 Input Source Selection

When OSD is on, select IN and use the 2,4,6,8 keys to select the desired input, then hit 5 or ENTER. When OSD is off, you can use the CH + key to change the input source.

6.3 Picture Settings

DISPLAY	Access to: Brightness, Contrast, Hue, Saturation and Flesh Tone settings
IMAGE	Access to Scaling, Adaptive De-interlacing, Noise Reduction, Auto-Filtering, Film Mode Detect and Sharpness settings
POSITION	Access Input Horizontal and Vertical Frame Offset and Horizontal and Vertical Flip Control
COLOR	Access to sRGB, Gamma Correction, Color Temperature, Red, Green and Blue settings

6.4 OSD Settings

Sets the on-screen display's Horizontal and Vertical positions, Blend, Timeout and Zoom.

6.5 SDI Settings

SDI Input Settings: Selects RGB, XYZ' or YPbPr (default) for single link and dual link formats. If the input format detected is single link, the single link settings will be used. When a signal is detected on Link-B, the dual link settings will be used. Defaults are YPbPr for Single Link formats and RGB for Dual Link formats.

6.6 Output Settings

DVI Resolution	-Auto (default): Use with all monitors up to 1920x1200. If the monitor reports a bad or unsupported resolution, the HDVI-20d will default to 1280x1024. In the case where this same monitor does not support 1280x1024, the output resolution can be forced using the infrared remote control and without the OSD interface by using the TV/Video + Number combination (see paragraph 3.1) -1024x768, 1280x720, 1280x768, 1280x1024, 1366x768, 1400x1050, 1920x1080, 1920x1200 and 1080i
DVI Frequency	-48Hz: Forces the DVI output to 48Hz -50Hz: Forces the DVI output to 50Hz -60Hz: This is the default mode, it should work with all displays 1920x1200 or below -Frame Sync: Eliminate motion artifacts by forcing the DVI output signal frequency to the same or double the SDI input frequency. All 24 and 48 FPS formats will be displayed at 48Hz All 25 and 50 FPS formats will be displayed at 50Hz All 29.97 (30) and 59.94 (60) FPS formats will be displayed at 59.94Hz (60Hz)
Pattern Mode	This menu has been removed in version 1.38 and higher. When input is set to pattern, the only available pattern is Color Bars.
H Sync Width	This setting is normally detected from the EDID message. If for any reason the EDID is wrong, these settings can be manually adjusted. Pressing ENTER twice will restore the default value
V Sync Width	Same note as for H Sync Width
H Back Porch	Same note as for H Sync Width
V Back Porch	Same note as for H Sync Width

6.7 Miscellaneous Menu

This menu can be used to reset the factory default settings of the unit. It also displays the monitor's native resolution, the current DVI output resolution, the current DVI output frequency, the infrared remote control status, the current input and the firmware version. After you reset the factory defaults, you MUST recycle power on the unit.
The reset function in this menu is different from the Reset I/O settings described earlier.

7 Troubleshooting

If the XDVI-20d does not output video to your monitor, refer to paragraph 6.1 to learn how to perform a **Reset I/O settings**.
Try to force the input and output modes using:

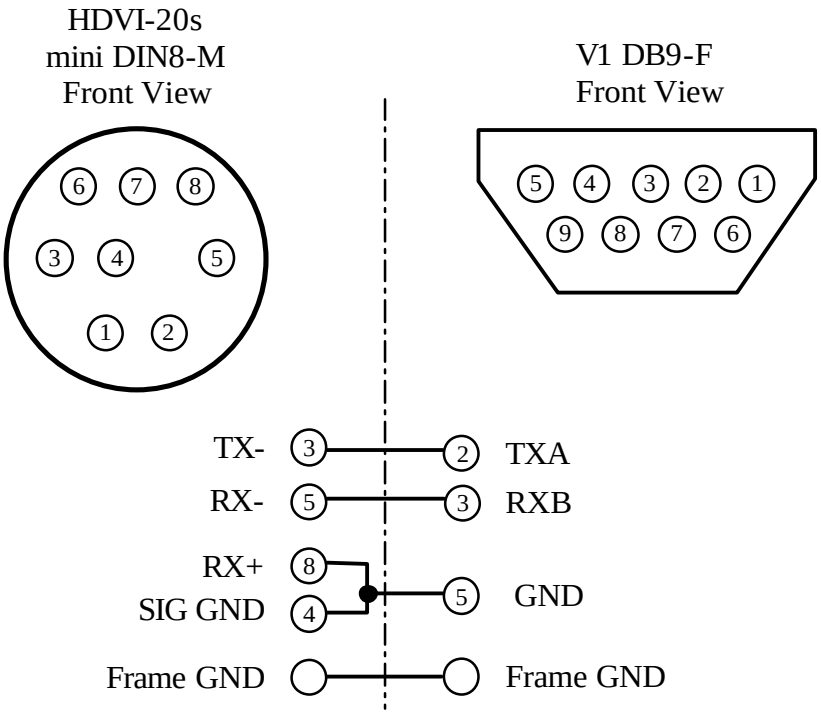
- **CH+** to force the input to Pattern, SDI, DVI-D, 3: DVI-A
- **TV/Video** + **0-9** to force the DVI-D output mode (see previous sections for listing)

8 Firmware Upgrade

To upgrade the firmware of the HDVI-20d, you need to have the HDVI-20d RS422-PC cable. You also need to have the 3 files HDVI20.exe, HDVI-20_Uploader.bat and the HDVI-20 bin file in your DOS directory. The DOS directory is the default directory when you launch the Command Prompt application under Windows.

1. Connect the HDVI-20d RS422-PC cable to a COM port on your PC
2. Connect the HDVI-20d to a DVI monitor
3. Force the HDVI-20d in flash mode by pressing and holding the TV/Video on your infrared remote until the picture becomes red.
4. Double click on the HDVI20_Uploader.bat icon and enter the serial port connected to the HDVI-20d and hit ENTER
5. Enter the binary file name of the HDVI-20 bin file and hit ENTER
6. The screen will start showing you progress and it will quit after the upgrade is over.
7. Recycle power on the HDVI-20d and go to the last menu and make sure the new firmware is installed.

8.1 Wiring of the HDVI-20d RS422-PC cable



9 Recommended LCD Monitors

All LCD monitors that support the resolutions listed in this document would work properly with the HDVI-20d.

For best motion performance in 720p application (most demanding), we recommend using displays with a response time of 16ms or less.

Doremi highly recommends the BenQ FP231W (1920x1200) to use with the XDVI-20 products. It can scan at all frame rates and has the best motion performance we have seen on an LCD panel.

9.1 Note about the Viewsonic VP2290b

Because the VP2290b is a 3840x2400 monitor, the HDVI-20d output must be forced to 1920x1200. This monitor supports Frame Sync and can be operated at frequencies as low as 24Hz. In addition, this monitor is pre-adjusted according to ITU-709 to be used as a high def. reference monitor. The combination of the HDVI-20d with the VP2290b creates a low cost reference monitor that competes with CRT reference monitors that are priced over $30,000 US Dollars.

9.2 Note about the Apple Cinema Displays

All Apple cinema displays are supported by the HDVI-20d except for the 30”. The Apple displays support 60Hz frequency only. Frame Sync Mode should not be set with these monitors; the HDVI-20d will display all input resolutions at 60Hz. Note that Apple Cinema displays with the ADC connector will need a DVI to ADC converter.

10 Specifications

INPUT

SMPTE 259M-C (270Mbps) and SMPTE 292M (1.485, 1.485/1.001 Gbps)
NTSC, PAL,
720p @ 60, 59.94 and 50Hz
1080p @ 30, 29.97, 25, 24 & 23.98Hz,
1080i @ 60, 59.94, 50, 48 & 47.95Hz
2K-p & 2K-psf @ 23.98 & 24Hz (2048x1080)

OUTPUT

DVI (Digital RGB) and DVI-HDTV (Digital RGB with HDTV resolution/frame rate) up to 1920x1200 progressive scan and 1080i formats.
Connector: DVI-D, Female, compliant to DVI 1.0

SUPPORTED MONITORS

Depending on your DVI monitor's resolution, the HDVI will either scale the video to fit your screen or output the video without scaling.

GENERAL

Size: Approx. 1 1/8th x 3 ¾ x 5 ½ (28mm x 95mm x 14mm)
Power: External Power Adapter with a locking power connector